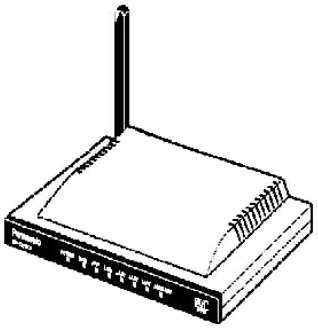
ORDER NO. KMS0411022C1
F5

Service Manual

Network Camera Management System

BB-HGW700A
(for U.S.A.)



2005 Panasonic Communications Co., Ltd. All rights reserved.
Unauthorized copying and distribution is a violation of law.

IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING
If lead free solder was used in the manufacture of this product the printed circuit boards will be marked PbF.
Standard leaded, (Pb), solder can be used as usual on boards without the PbF mark.
When this mark does appear please read and follow the special instructions described in this manual

on the use of PbF and how it might be permissible to use Pb solder during service and repair work.

1. ABOUT LEAD FREE SOLDER (PbF: Pb free)

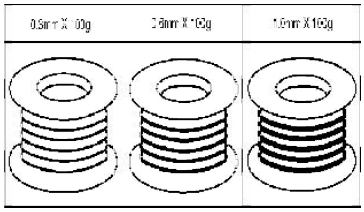
Note:
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.
We will use PbF solder when discussing the lead free solder used in our manufacturing process which is made from Tin, (Sn), Silver, (Ag), and Copper, (Cu).
This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB. For service and repair work we suggest using the same type of solder although, with some precautions, standard Pb solder can also be used.

Caution

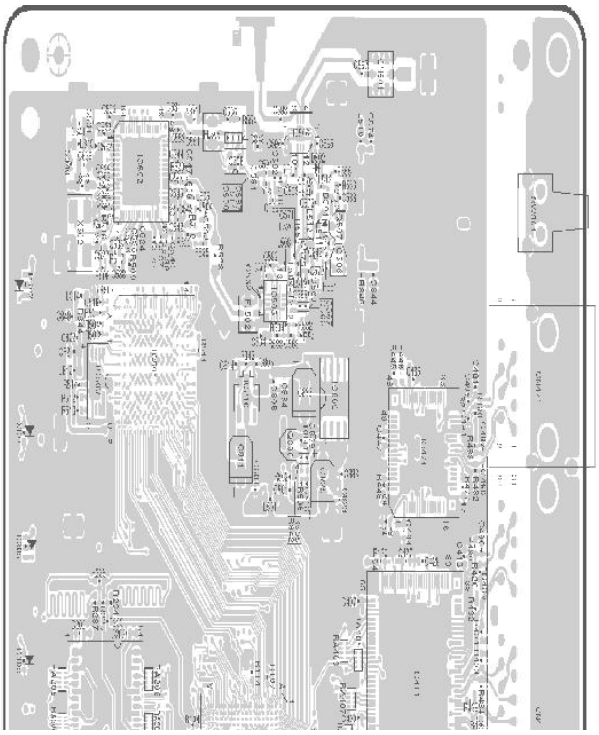
- **PbF solder has a melting point that is 50° ~ 70° F, (30° ~ 40°C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700° ± 20° F, (370° ± 10°C). In case of using high temperature soldering iron, please be careful not to heat too long.**
- **PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100°F, (600°C).**
- **If you must use Pb solder on a PCB manufactured using PbF solder, remove as much of the original PbF solder as possible and be sure that any remaining is melted prior to applying the Pb solder.**
- **When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See figure, below).**

1.1. SUGGESTED PbF SOLDER

There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper, (Sn+Ag+Cu), you can also use Tin and Copper, (Sn+Cu), or Tin, Zinc, and Bismuth, (Sn+Zn+Bi). Please check the manufacturer's specific instructions for the melting points of their products and any precautions for using their product with other materials. The following lead free (PbF) solder wire gauge are recommended for service of this product: 0.3mm, 0.6mm and 1.0mm.



1.2. HOW TO RECOGNIZE THAT Pb FREE SOLDEmpR IS USED



2. FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.

When replacing, the following precautions will help to prevent recurring malfunctions.

1. Cover the plastic parts with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on the work-table.
4. Do not grasp IC or LSI pins with bare fingers.

3. CAUTION

3.1. SAFETY PRECAUTIONS

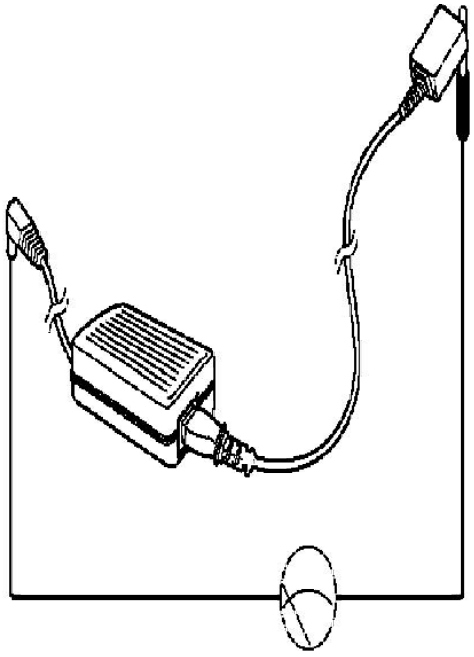
1. Before servicing, unplug the power cord to prevent an electrical shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, make the following insulation resistance test to prevent a shock hazard.

3.2. INSULATION RESISTANCE TEST

1. Unplug the AC power cord and short the two prongs of the plug with a jumper wire.
2. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screw threads, etc.

Note:
Some exposed parts may be isolated from the chassis by design. These will read infinity.

3. If the measurement is outside the specified limits, there is a possibility of shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.



Resistance = more than 1MΩ (at DC 500 V)

3.3. POWER CAUTION

The power socket wall outlet should be located near this equipment and be easily accessible.

4. SPECIFICATIONS

Main Unit

Heading	Specifications	
Power Supply	Special AC Adaptor: (Part Number: PQLV202Y)	INPUT: AC120V, 60 Hz OUTPUT: DC120 V, 750mA DC Cord: approx 3m AC Cord: approx 1.7m (attached separately)
Power Consumption	Maximum: approx 6W	
Dimensions (Width x Height x Depth)	About 204mm (8.0inches) x About 36mm (1.4inches) x About 140mm (5.5inches) (when the antenna is stored)	
Weight	330g (0.7 lb)	
Environmental Requirements	Temperature (°C): Humidity (%):	0 - 40 (32 - 104°F) 20 - 85 (non-condensing)
WAN Interface	Number of Ports: Connector Shape: Physical Interface: Throughout between WAN and LAN (value measured at Panasonic):	1 8 pin modular jack (RJ-45) IEEE 802.3 (10Base-T) IEEE 802.3u (100Base-TX) Maximum of 98Mbps (IPv4/SmartBits) Maximum of 77Mbps (IPv6/SmartBits) Maximum of 16Mbps (FTP[PPTP])
LAN Interface	Number of Ports: Connector Shape: Physical Interface:	4 8 pin modular jack (RJ-45) IEEE 802.3 (10Base-T) IEEE 802.3u (100Base-TX)
Wireless Interface	Wireless Chip: IEEE 802.11b Transmission Method: Transmission Speed ([Standard value]Mbps): Frequency Range (MHz): Number of Channels: Security: IEEE 802.11g Transmission Method: Transmission Speed ([Standard value]Mbps): Frequency Range (MHz): Number of Channels: Security:	made by Atheros Communications DS-SS, half-duplex 11/5.5/2/1* (complying to IEEE 802.11b): automatic fallback 2412 - 2462 (center frequency) 11 WPA-PSK (TKIP), WPA2-PSK (AES), WEP (64 bit/128 bit/152 bit), SSID, stealth SSID (hidden SSID, permitting/not permitting connection using the ANY key), MAC address filtering OFMD (complying to IEEE 802.11g)/DS-SS (compatible with IEEE 802.11b), half-duplex 54/48/36/24/18/12/9/6* (complying to IEEE 802.11g): automatic fallback 2412 - 2462 (center frequency) 11 WPA-PSK (TKIP), WPA2-PSK (AES), WEP (64 bit/128 bit/152 bit), SSID, stealth SSID (hidden SSID, permitting/not permitting connection using the ANY key), MAC address filtering
	-The figures shown are theoretical maximums and not the actual figures when using the product.	

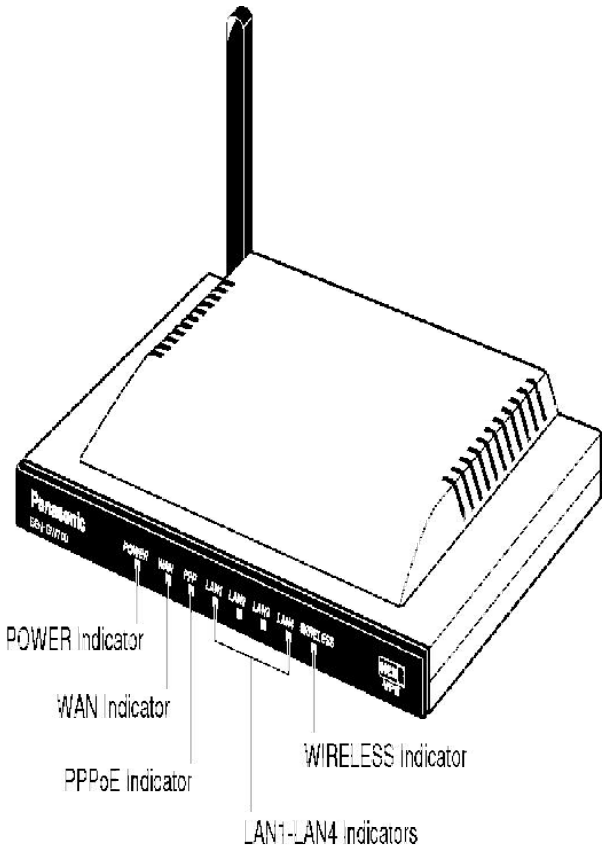
Heading	Specifications	
User Interface	FACTORY DEFAULT RESET button:	Returns the product to factory default settings.
	Status Indicators	
	POWER:	Displays the power/main unit status
	WAN:	Displays the WAN link status
	PPP:	Displays the PPP link status
	LAN1-LAN4:	Displays the Ethernet link status
	WIRELESS:	Displays the wireless link status

Software

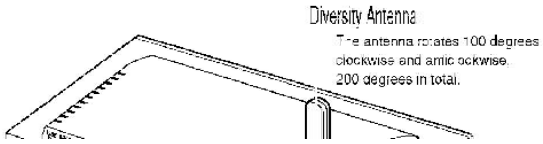
Heading	Specifications	
Router Function	WAN Side Connection Mode:	PPPoE/DHCP/Static
	PPPoE Connection:	Always/Manual
	RIP:	Yes (RIPv2)
	DHCP Server:	Yes (128 client setup is possible)
	DNS Relay (DNS proxy answering):	Yes
	IP Packet Filtering:	Yes (64 setup)
	Address Translation Method:	IP masquerade, port forwarding
Wireless Device Function	Security:	WPA-PSK (TKIP), WPA2-PSK (AES), WEP (64 bit/128 bit/152 bit), stealth SSID (hidden SSID, permitting/not permitting connection using the ANY key), MAC address filtering
Access Control	ID/Password	
Web Browser Setup	Yes	
Firmware Update	Yes	

5. PARTS LOCATIONS

5.1. FRONT VIEW



5.2. REAR VIEW



6. SYSTEM REQUIREMWNTS

The PC (Personal Computer) and the network must meet the following technical specifications for the BB-HGW700A to work properly.

Item	Description
Operating System	Microsoft ® Windows 98 SE / Microsoft Windows Me / Microsoft ® Windows 2000 / Microsoft Windows XP
Interface	10/100 Mbps Ethernet card and Ethernet cables for your network connection
RAM	64MB or more
Protocol	TCP/IP network protocol installed
Web Browser	Internet Explorer 6.0 or later

Compatible network cameras (Customer-provided): (as of Nov. 2004)

Indoor type
KX-HCM8
KX-HCM10
KX-HCM250
KX-HCM280
BB-HCM311A
BL-C10A
BL-C30A

Outdoor type
KX-HCM230
KX-HCM270
BB-HCM331A

7. CONNECTIONS

7.1. INTERNET CONFIGURATION WITH OPTICAL CABLE OR CABLE/ xDSL MODEM - (TYPE 1)

8. DISASSEMBLY INSTRUCTIONS

8.1. HOW TO REMOVE THE CABINET COVER

1. Remove two Screws (A). **2. Remove the Cabinet Cover.**	

8.2. HOW TO REMOVE THE MAIN BOARD AND ANTENNA

1. Remove four Screws (B). 2. Remove the Solder (two points) of Antenna Cable. 3. Remove the Main Board. 4. Remove the Antenna.	

9. TROUBLE SHOUTING GUIDE

- Press the initializing button to return the unit to initial state.
- Connect Cable/XDSL modem to WAN port with cable.
- Connect PCs to ports of LAN 1 ~ LAN 4 with cable.
- Insert wireless network card (IEEE802.11b) into the PC.
- Program the property of the PC. (Property 1)

9.1. SETTING PC

9.1.1. Setting 1

LAN 1 PC

IP Address:	**192.168.0.200**
Netmask:	**255.255.255.0**
DNS:	**-**
Default Gateway (router)	**-**

LAN 2 PC

IP Address:	**192.168.0.201**
Netmask:	**255.255.255.0**
DNS:	**-**
Default Gateway (router):	**-**

LAN 3 PC

IP Address:	**192.168.0.202**
Netmask:	**255.255.255.0**
DNS:	**-**
Default Gateway (router):	**-**

LAN 4 PC

IP Address:	**192.168.0.203**
Netmask:	**255.255.255.0**
DNS:	**-**
Default Gateway (router):	**-**

Wireless PC

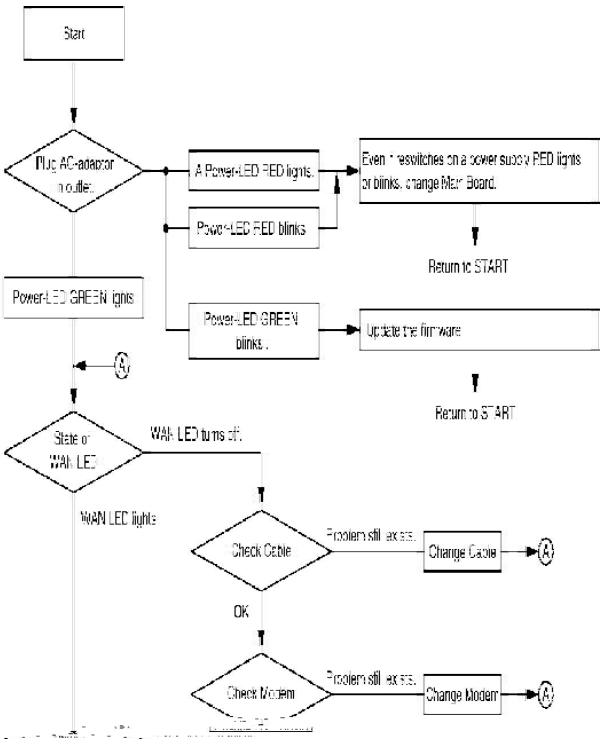
IP Address:	**192.168.0.204**
Netmask:	**255.255.255.0**
DNS:	**-**
Default Gateway (router):	**-**
SSID	**Refer to the Label on the bottom of the Unit**
WEP (128 bit)	**Refer to the Label on the bottom of the Unit**
Communication mode	**Infrastructure**

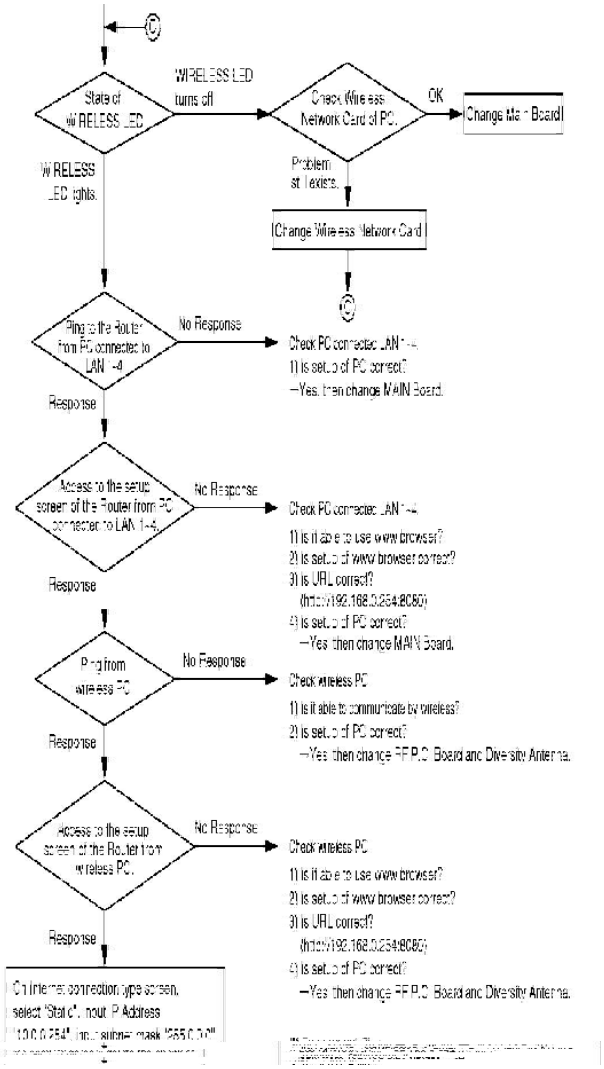
9.1.2. Setting 2

WAN PC

IP Address:	**10.0.0.100**
Netmask:	**255.0.0.0**

9.2. PROCEDURE DIAGNOSIS AND REPAIR




State of W RELESS LED
WIRELESS LED turns off
Check Wireless Network Card of PC.
OK
Change Main Board
W RELESS LED lights.
Problem at Texas.
Change Wireless Network Card
Ping to the Router from PC connected to LAN 1~4
No Response
Check PC connected LAN 1~4.
1) Is set up of PC correct?
—Yes, then change MAIN Board.
Response
Access to the setup screen of the Router from PC connected to LAN 1~4.
No Response
Check PC connected LAN 1~4.
1) Is it able to use www browser?
2) Is set up of www browser correct?
3) Is URL correct?
(http://192.168.0.254:8080)
4) Is set up of PC correct?
—Yes, then change MAIN Board.
Response
Ping from wireless PC
No Response
Check wireless PC
1) Is it able to communicate by wireless?
2) Is set up of PC correct?
—Yes, then change RF P.C. Board and Diversity Antenna.
Response
Access to the setup screen of the Router from wireless PC.
No Response
Check wireless PC
1) Is it able to use www browser?
2) Is set up of www browser correct?
3) Is URL correct?
(http://192.168.0.254:8080)
4) Is set up of PC correct?
—Yes, then change RF P.C. Board and Diversity Antenna.
Response
On Internet connection type screen, select "Static", input IP Address

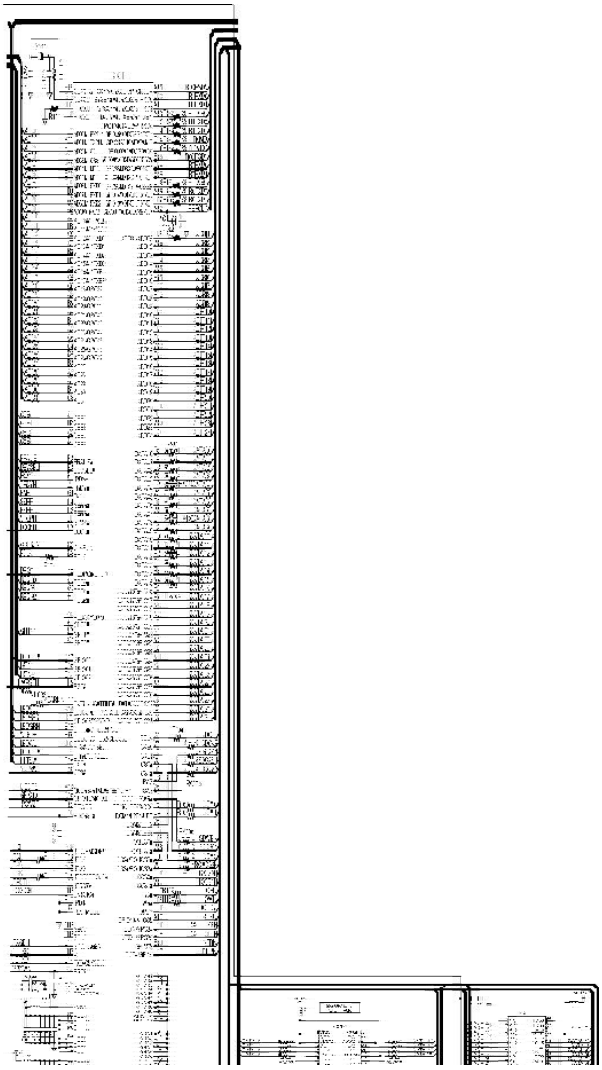
10. BLOCK DIAGRAM

11. CIRCUIT DESCRIPTION

11.1. MAIN BOARD (MAIN UNIT)

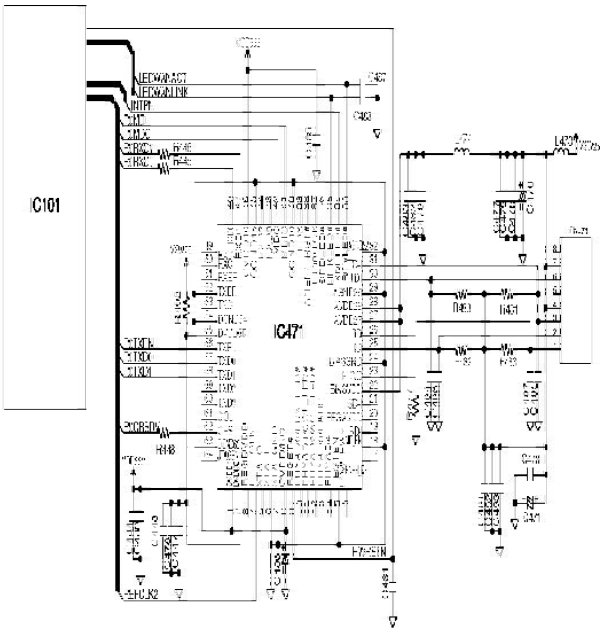
11.1.1. Control Block

CPU (IC101) is a single chip processor with several functions such as protocol control, network control, and memory control.
The program is stored in the readable/writable Flash ROM (IC222), and SDRAM (IC201, IC202) are used in data processing.



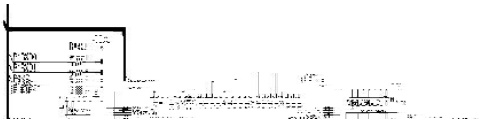
11.1.2. WAN Block

CPU (IC101) is connected by RMII (Reduced Media Independent Interface) to the Ether PHY IC (IC471). The Connector (CN471) incorporates a transformer, which is used to isolate in and out of the set.



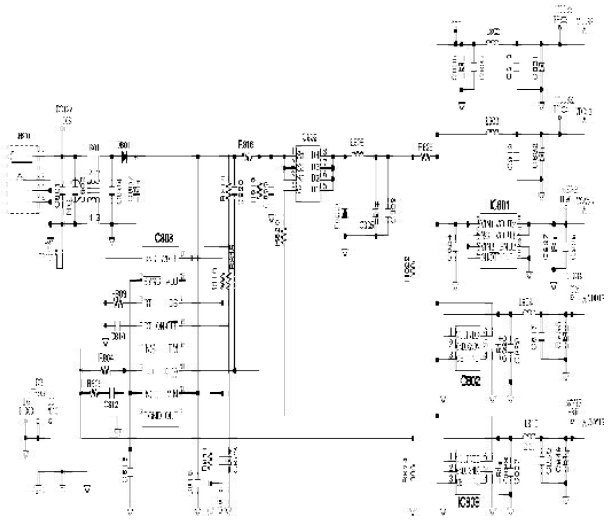
11.1.3. LAN Block

CPU (IC101) is connected by RMII (Reduced Media Independent Interface) to the Ether Switch IC (IC411). The Ether Switch IC (IC411) is connected to the 4 port Connector (CN411). The 4 port Connector (CN411) incorporates a transformer, which is used to isolate in and out of the set.



11.1.4. Power Supply Block

DC12V which is the output of AC adapter is supplied to the main set. The DC/DC converter (IC808) converts DC12V to around 3.3V, and also generates the DC power supply needed for each block. The voltage is divided into a 3.3V system, a 2.5V system and a 1.5V system.
The 3.3V system is supplied to each part as VDD33 (Control block), VDD332 (WAN block, LAN block) and VRF (RF block).
The 2.5V system's voltage is transformed in the regulator IC (IC801) and is supplied to the WAN block and LAN block as VSW25.
The 1.5V system's voltage is transformed in the regulator IC (IC802, IC803) and is supplied to each block as VDD15 (Control block), VSWIS (LAN block).



11.2. RF BLOCK

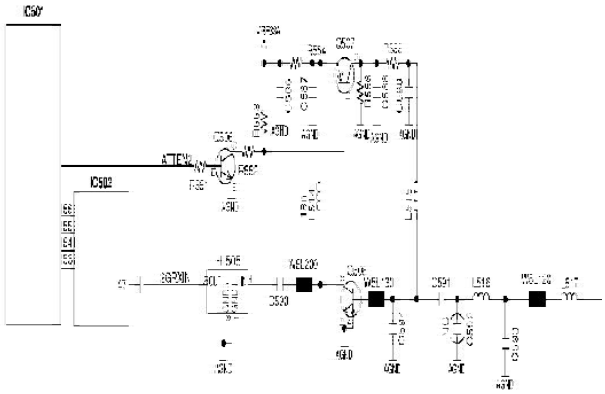
11.2.1. Antenna

A /2 dipole antenna is used.
MAC/BBIC (IC501) controls the antenna switch (IC506). It switches the external antenna so as to transmit or receive.

11.2.2. Reception Block

The receiving signal from the antenna transits the antenna switch (IC506). The signal is then inputted to RFIC (IC502) after being amplified by LNA (Low Noise Amp). The RFIC (IC502) incorporates the LNA

(Low Noise Amp), the Mixer for Frequency Converter and Synthesizer, which generates the received local signals. The input signal is separated into the baseband signal In-Phase (RxI) and Quadrature (RxQ) in RFIC (IC502), and is then outputted.
The baseband signal is inputted to MAC/BBIC (IC501) and is converted to A/D, to reproduce original data.



11.2.3. Transmission Block

The data frame (data packet) generated in the built-in MAC in MAC/BBIC (IC501) is converted to an In-Phase (TxI) and Quadrature (TxQ) signal, and it is then inputted to RFIC (IC502).
The signal is converted to an RF signal with the transmission frequency band in RFIC (IC502).
Then, an impedance conversion, a level adjustment and a suppression of the unnecessary frequency component are processed. The processed signal is then transmitted from the antenna via the antenna switch (IC506).
Meanwhile, the RF signal that was amplified in IC505 is fed-back to RFIC (IC502) after the level detection. The RFIC (IC502) adjusts the gain in order to keep the output level of the transmission constant.

12. HOW TO REPLACE A FLAT PACKAGE IC

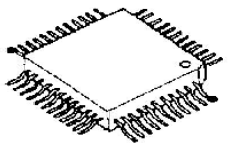
12.1. PREPARATION

- PbF (: Pb free) Solder
- Soldering Iron
  Tip Temperature of 700°F ± 20°F (370°C ± 10°C)
  Note: We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.
- Flux
  Recommended Flux: Specific Gravity 0.82.
  Type → RMA (lower residue, non-cleaning type)

Note: See ABOUT LEAD FREE SOLDER (PbF: Pb free) ().

12.2. PROCEDURE

1. Tack the flat pack IC to the PCB by temporarily soldering two diagonally opposite pins in the correct positions on the PCB.



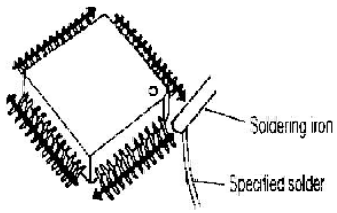
●– – – – – –Temporary soldering point.

Be certain each pin is located over the correct pad on the PCB.

2. Apply flux to all of the pins on the IC.

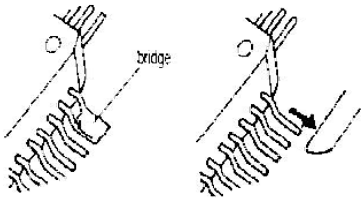
3. Being careful to not unsolder the tack points, slide the soldering iron

along the tips of the pins while feeding enough solder to the tip so that it flows under the pins as they are heated.

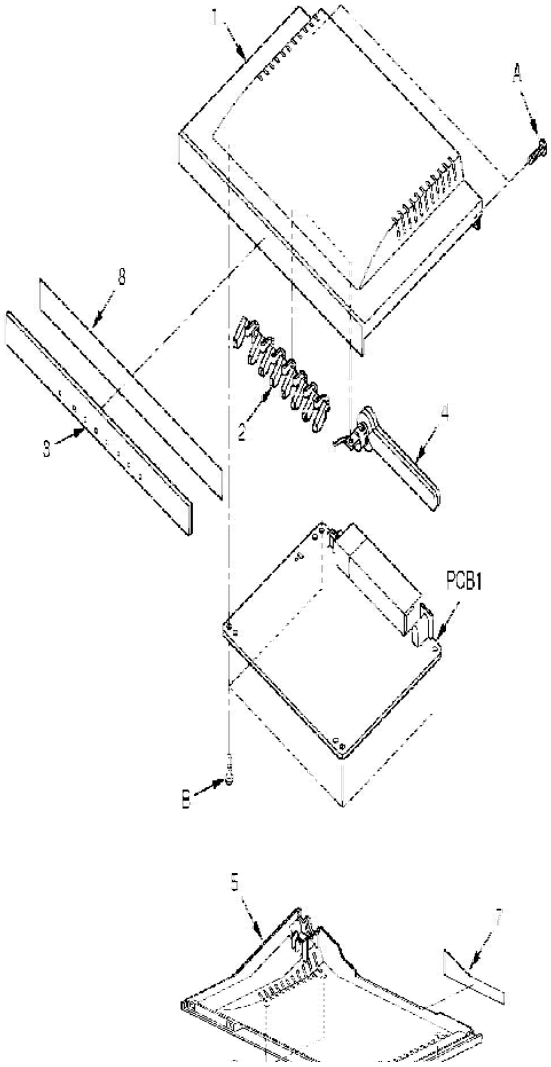


12.3. REMOVING SOLDER FROM BETWEEN PINS

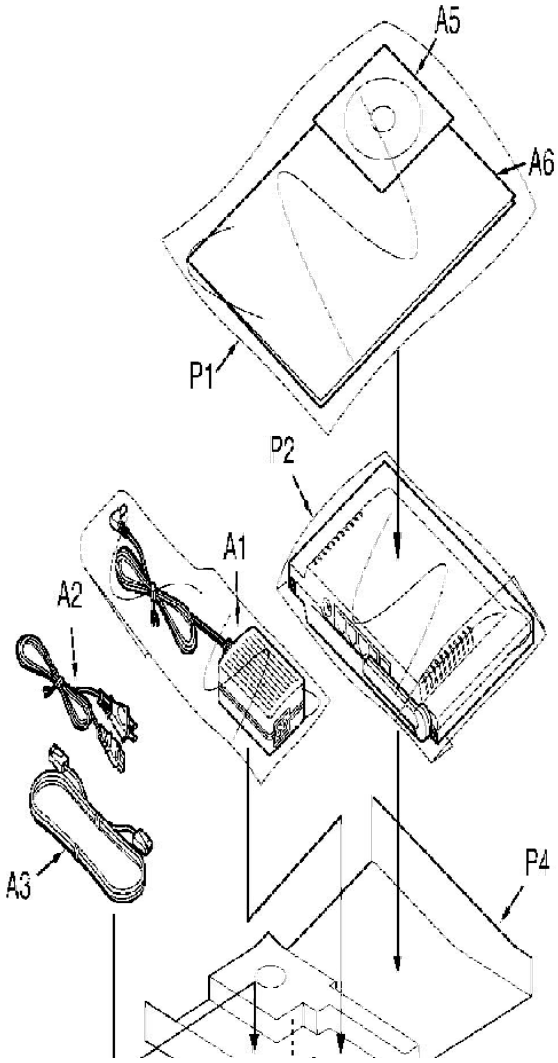
1. Add a small amount of solder to the bridged pins.
2. With a hot iron, use a sweeping motion along the flat part of the pin to draw the solder from between the adjacent pads.

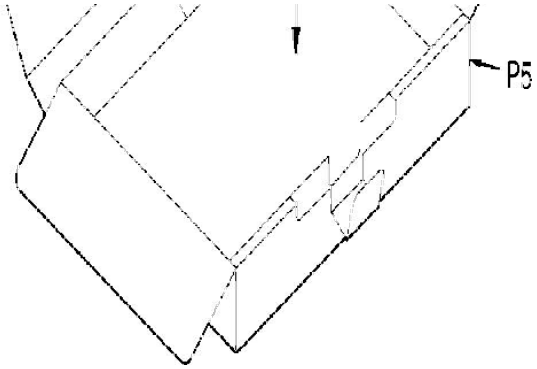


13. CABINET AND ELECTRICAL PARTS LOCATION



14. ACCESSORIES AND PACKING MATERIALS

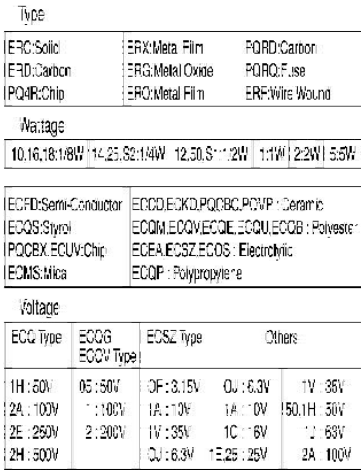

A5
A6
P1
P2
A1
A2
A3
P4



15. REPLACEMENT PARTS LIST

Note:

1. **RTL (Retention Time Limited)**
   The marking (RTL) indicates that the Retention Time is limited for this item.
   After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability depends on the type of assembly and the laws governing parts and product retention. At the end of this period, the assembly will no longer be available.
2. **Important safety notice**
   Components identified by the ⚠ mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacture's parts.
3. **The S mark means the part is one of some identical parts. For that reason, it may be different from the installed part.**
4. **ISO code (Example: ABS-94HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.**
5. **RESISTORS & CAPACITORS**
   Unless otherwise specified;
   All resistors are in ohms ( ), k=1000 , M=1000k
   All capacitors are in MICRO FARADS (F), p= (F)
   ***Type & Wattage of Resistor**



Type

ERC:Solid	ERX:Meta Film	PQRD:Carbon
ERD:Carbon	ERG:Metal Oxide	PQRQ:Fuse
PQ4R:Chip	ERQ:Metal Film	ERF:Wire Wound

Wattage

10,16,18:1/8W	14,25,32:1/4W	12,50,S***:2W	1:1W	2:2W | 5:5W

ECFD:Semi-Conductor	ECCD,ECKD,PQCBC,PCVP : Ceramic
ECQS:Styrol	ECQM,ECQV,ECQE,ECQU,ECQB : Polyester
PQCBX,ECUV:Chip	ECEA,ECSZ,ECOS : Electrolytic
ECMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type		Others	
1H : 50V	05 : 50V	0F : 3.15V	0J : 6.3V	1V : 35V	
2A : 100V	1 : 100V	1A : 10V	1A : 10V	50,1H : 50V	
2E : 250V	2 : 200V	1V : 35V	1C : 16V	1J : 63V	
2H : 500V		0J : 6.3V	1E,25 : 25V	2A : 100V	

15.1. CABINET AND ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
1	PQKM10645Y1	CABINET BODY	ABS-V0
2	PQHR11046Z	OPTIC CONDUCTIVE PARTS	PS-V0
3	PQGP10260Y1	PANEL	
4	PSSA1031Z	ANTENNA	ABS-V0
5	PQKF10628Z1	CABINET COVER	ABS-V0
6	PSHA1015Z	RUBBER PARTS	
7	PSGT2639Z	NAME PLATE	
8	PSHE1171Z	TAPE	

15.2. ACCESSORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PQLV202Y	AC ADAPTOR	
A2	PSJA1069Z	POWER CORD	
A3	PQJA10138Z	CORD	
A4	PQYLHGW502	STAND	
A5	PSQX3487ZCD	CD-ROM, INSTRUCTION BOOK	
A6	PSQX3486Z	INSTRUCTION BOOK	
P1	XZB20X35A04	PROTECTION COVER (FOR CD-ROM etc.)	
P2	PQPH89Z	PROTECTION COVER (FOR SET)	
P3	XZB10X20A04	PROTECTION COVER (FOR STAND)	
P4	PSPD1295Z	CUSHION	
P5	PSPK2289Z	GIFT BOX	

15.3. MAIN BOARD PARTS

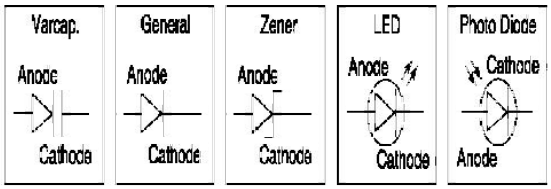
Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PSWPHGW700A	MAIN BOARD ASS'Y (RTL)	

16. FOR THE SCHEMATIC DIAGRAM

Note:

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.

2. The schematic diagrams and circuit board may be modified at any time with the development of new technology.



Important safety notice
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of there components, use only manufacturer's specified parts.

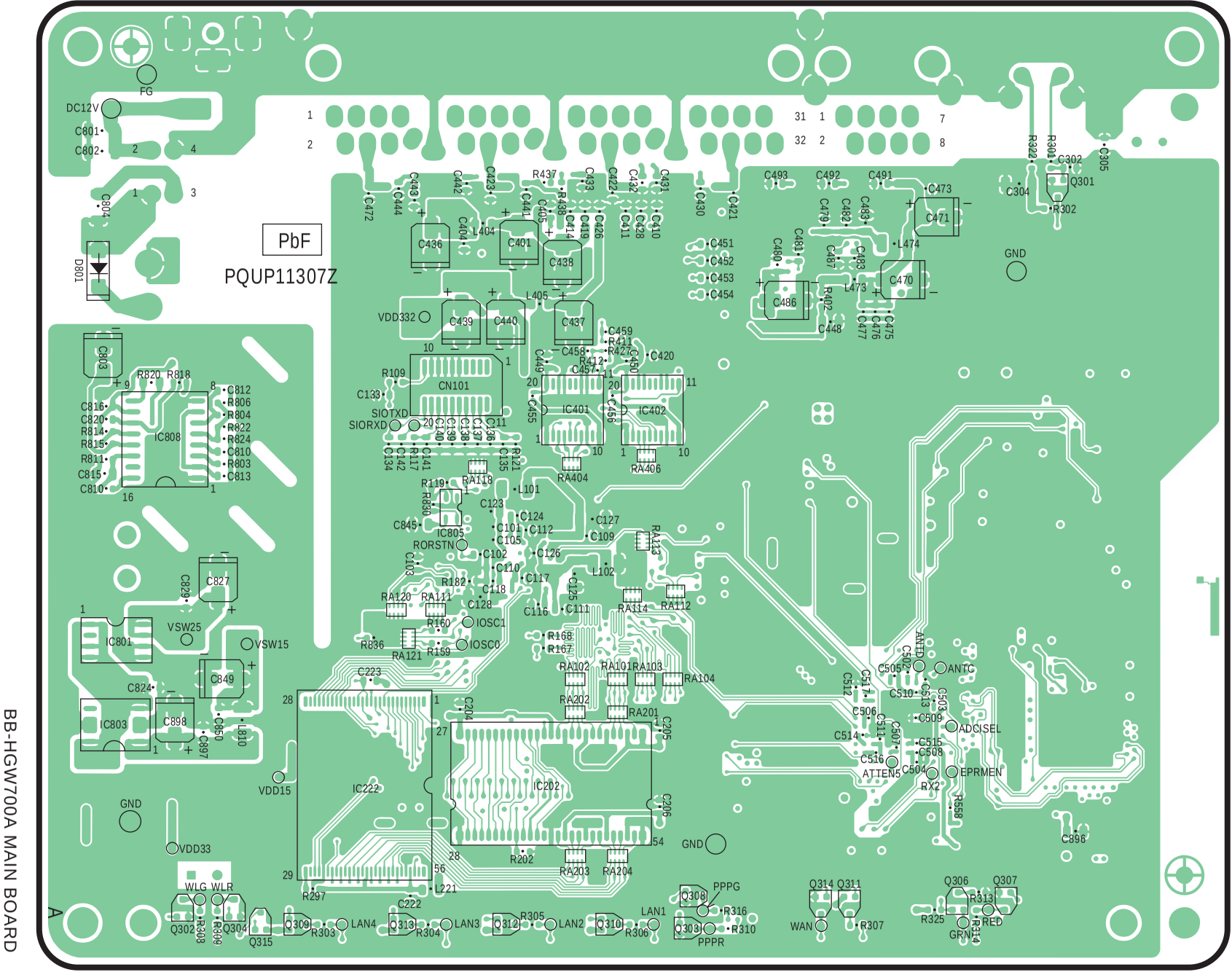
17. SCHEMATIC DIAGRAM

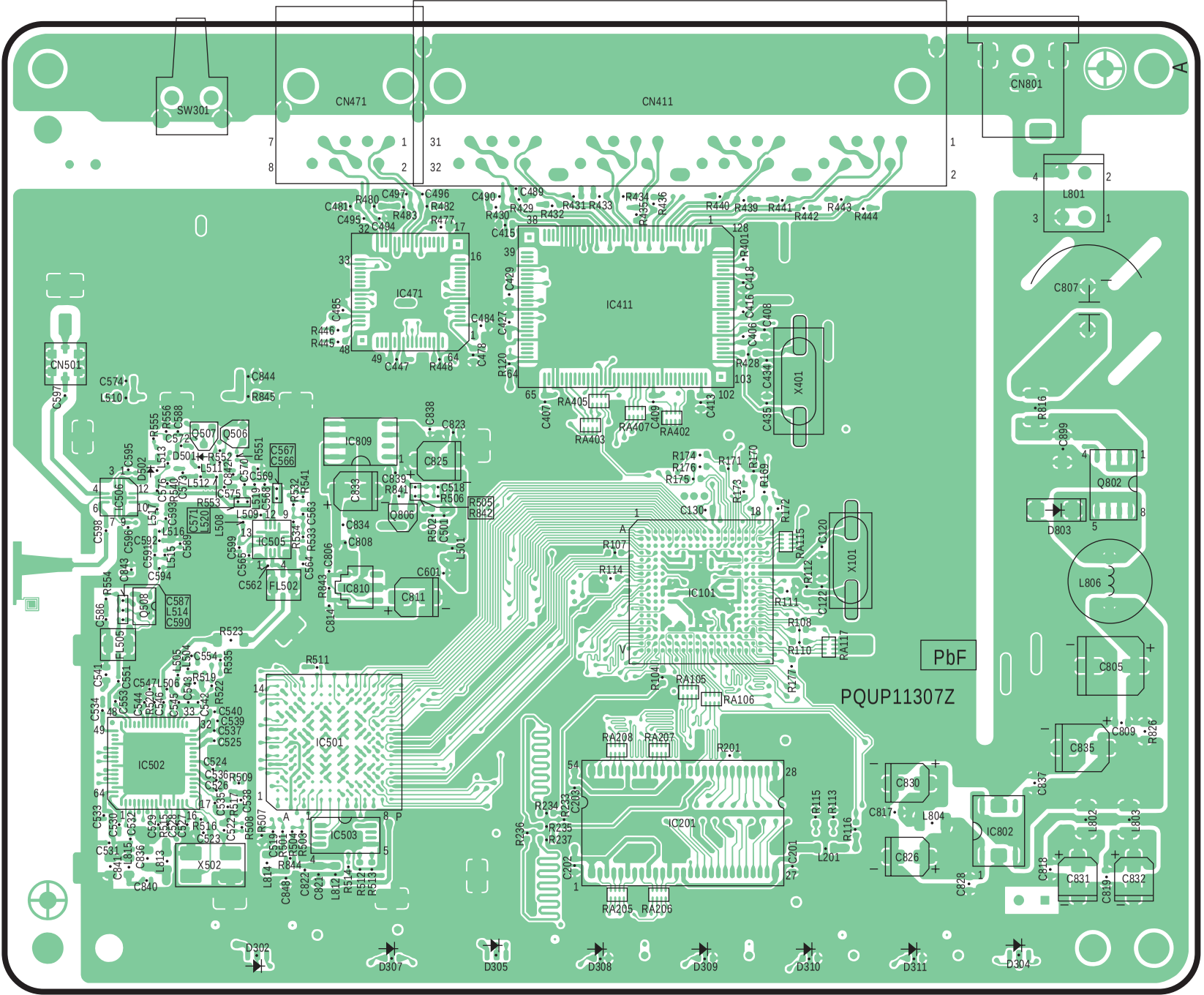
18. CIRCUIT BOARD

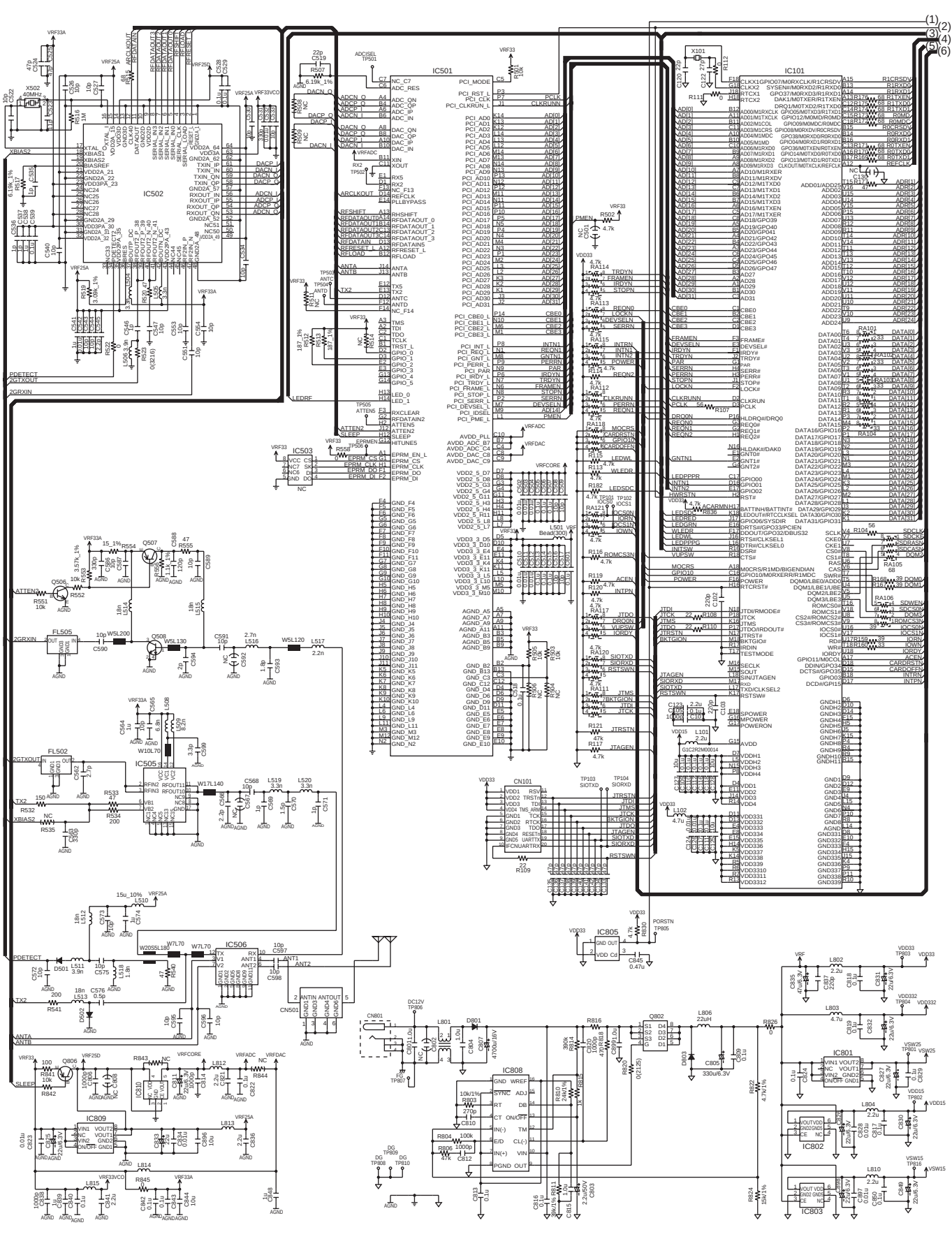
18.1. MAIN BOARD (COMPONENT VIEW)

18.2. MAIN BOARD (BOTTOM VIEW)

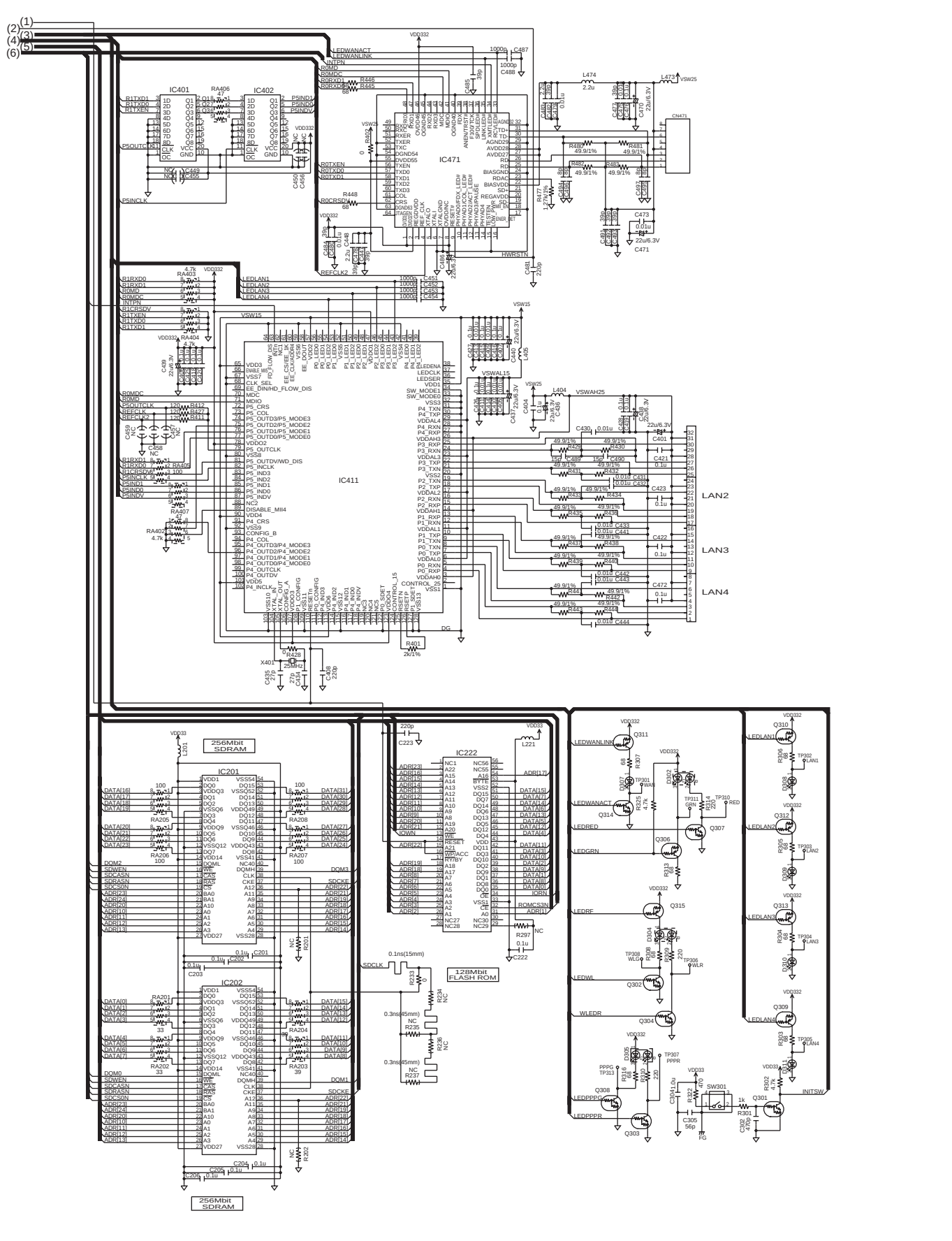
A BBHGW700A


PbF
PQUP11307Z
BB-HGW700A MAIN BOARD
A
DC12V
FG
GND
VDD332
VDD15
VDD33
SIOTXD
SIORXD
RORSTN
IOSC1
IOSC0
VSW25
VSW15
WLG
WLR
LAN1
LAN2
LAN3
LAN4
WAN
PPPG
PPPR
ANTD
ANTC
ADCSEL
EPRMEN
ATTEN5
RX2
RED
GRN
IC801
IC803
IC808
IC222
IC202
IC401
IC402
IC805
CN101

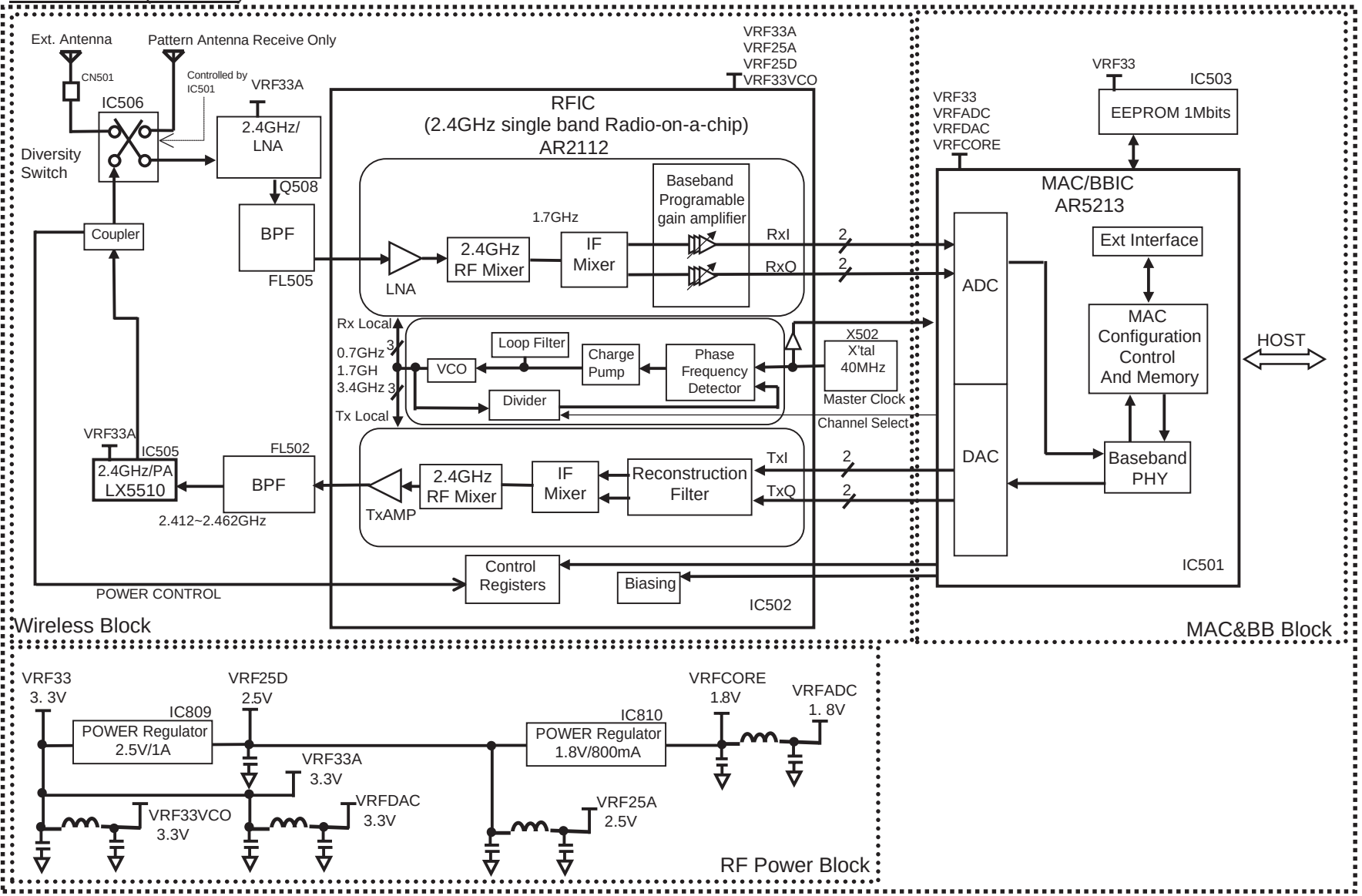

BB-HGW700A MAIN BOARD
PQUP11307Z
PbF
SW301
CN471
CN411
CN801
CN501
L801
IC471
IC411
IC101
IC501
IC502
IC503
IC802
X401
X101
X502
Q802
D803
L806
C807
C805
C809
C835
C831
C832
C826
C830
L804
D302
D307
D305
D308
D309
D310
D311
D304



BB-HGW700A MAIN BOARD (1/2)



BB-HGW700A MAIN BOARD (2/2)


Ext. Antenna
Pattern Antenna Receive Only
CN501
Controlled by IC501
VRF33A
IC506
Diversity Switch
2.4GHz/ LNA
Q508
BPF
FL505
Coupler
VRF33A
VRF25A
VRF25D
VRF33VCO
RFIC
(2.4GHz single band Radio-on-a-chip)
AR2112
Baseband Programable gain amplifier
1.7GHz
LNA
2.4GHz RF Mixer
IF Mixer
RxI
RxO
2
2
Rx Local
0.7GHz
1.7GH
3.4GHz
3
Loop Filter
VCO
Charge Pump
Phase Frequency Detector
Divider
X502
X'tal 40MHz
Master Clock
Channel Select
Tx Local
VRF33A
IC505
2.4GHz/PA LX5510
FL502
BPF
2.412~2.462GHz
TxAMP
2.4GHz RF Mixer
IF Mixer
Reconstruction Filter
TxI
TxQ
2
2
Control Registers
Biasing
IC502
POWER CONTROL
Wireless Block
VRF33
VRFADC
VRFDAC
VRFCORE
VRF33
IC503
EEPROM 1Mbits
MAC/BBIC
AR5213
Ext Interface
ADC
DAC
MAC Configuration Control And Memory
Baseband PHY
HOST
IC501
MAC&BB Block
VRF33
3. 3V
IC809
POWER Regulator
2.5V/1A
VRF25D
2.5V
VRF33A
3.3V
VRF33VCO
3.3V
VRFDAC
3.3V
IC810
POWER Regulator
1.8V/800mA
VRFCORE
1.8V
VRFADC
1. 8V
VRF25A
2.5V
RF Power Block

BB-HGW700A(Control Block)